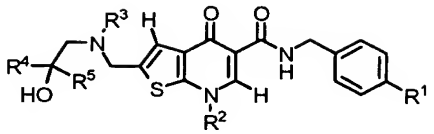
CLAIMS

We claim:

1. A compound of formula I,



I

its enantiomeric, diasteromeric or tautomeric isomer, or a pharmaceutically acceptable salt thereof wherein,

R^1 is

(a) Cl,

(b) Br,

(c) F, or

(d) CN;

R^2 is

(a) C_{1-4}alkyl optionally substituted by one or more OH or C_{1-4}alkoxy, or

(b) $(CH_2)_mOCH_2CH_2OH$;

R^3 is C_{1-2}alkyl;

R^4 is a six- (6) membered heteroaryl bonded via a carbon atom having 1, 2, or 3 nitrogen atoms, wherein R^4 is optionally fused to a benzene ring, and optionally substituted with one or more R^6;

R^5 is

(a) H, or

(b) C_{1-2}alkyl optionally substituted by OH;

R^6 is

(a) halo,

(b) OCF_3,

(c) cyano,

(d) nitro,

(e) $CONR^7R^8$,

(f) NR^7R^8,

(g) C_{1-7}alkyl, which is optionally partially unsaturated and is optionally substituted by one or more R^9,

(h) $O(CH_2CH_2O)_nR^{10}$,

(i) OR^{10}, or

(j) CO_2R^{10};

R^7 and R^8 are independently

(a) H,

(b) phenyl optionally substituted by halo, C_{1-7}alkyl, or C_{1-7}alkoxy,

(c) C_{1-7}alkyl which is optionally substituted by one or more OR^{10}, phenyl, or halo substituents,

(d) C_{3-8}cycloalkyl,

(e) $(C=O)R^{11}$, or

(f) R^7 and R^8 together with the nitrogen to which they are attached form a het, wherein het is a five- (5), or six- (6) membered heterocyclic ring having 1, 2, or 3 heteroatoms selected from the group consisting of oxygen, sulfur, or nitrogen, wherein het is optionally substituted with C_{1-4} alkyl;

R^9 is

(a) oxo,

(b) phenyl optionally substituted by halo, C_{1-7}alkyl, or C_{1-7}alkoxy,

(c) OR^{10},

(d) $O(CH_2CH_2)OR^{10}$,

(e) SR^{10},

(f) NR_7R_8,

(g) halo,

(h) CO_2R^{10},

(i) $CONR^{10}R^{10}$, or

(j) C_{3-8}cycloalkyl optionally substituted by OR^{10};

R^{10} is

(a) H,

(b) C_{1-7}alkyl,

(c) C_{3-8}cycloalkyl, or

(d) phenyl optionally substituted by halo, C_{1-7}alkyl, or C_{1-7}alkoxy;

R^{11} is

(a) C_{1-7}alkyl,

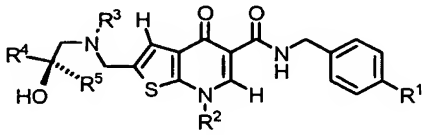
(b) C_{3-8}cycloalkyl, or

(c) phenyl optionally substituted by halo, C_{1-7}alkyl, or C_{1-7}alkoxy;

n is 1, 2, 3, 4 or 5; and

m is 1 or 2.

2. A compound of claim 1 which is a compound of formula IA



IA.

wherein, R^1, R^2, R^3, R^4, and R^5 are as defined according to claim 1.

3. A compound of claim 1 wherein R^1 is chloro.

4. A compound of claim 1 wherein R^2 is C_{1-3}alkyl.

5. A compound of claim 1 wherein R^2 is methyl.

6. A compound of claim 1 wherein R^2 is C_{1-3}alkyl substituted with one or two hydroxy.

7. A compound of claim 1 wherein R^2 is C_{1-4}alkyl substituted by C_{1-4}alkoxy.

8. A compound of claim 1 wherein R^3 is methyl.

9. A compound of claim 1 wherein R^3 is ethyl.

10. A compound of claim 1 wherein R^4 is a six- (6) membered heteroaryl bonded via a carbon atom having one (1) or two (2) nitrogen atoms.

11. A compound of claim 1 wherein R^4 is a six- (6) membered heteroaryl bonded via a carbon atom having one (1) nitrogen atom.

12. A compound of claims 10 wherein R^4 is substituted with R^6.

13. A compound of claim 10 wherein R^4 is pyridin-2-yl, pyridin-3-yl, pyridin-4-yl, pyrimidin-2-yl, pyridazin-3-yl, or pyrazin-2-yl.

14. A compound of claim 11 wherein R^4 is pyridin-2-yl.

15. A compound of claim 13 wherein R^4 is pyrimidin-2-yl.

16. A compound of claim 13 wherein R^4 is pyrazin-2-yl.

17. A compound of claim 12 wherein R^4 is 6-methylpyridin-2-yl.

18. A compound of claim 1 wherein R^4 is a six- (6) membered heteroaryl bonded via a carbon atom having one (1) or two (2) nitrogen atoms and is fused to a benzene ring.

19. A compound of claim 18 wherein R^4 is quinolin-2-yl.

20. A compound of claim 18 wherein R^4 is substituted by R^6.

21. A compound of claim 1 wherein R^5 is hydrogen.

22. A compound of claim 12 or 20 wherein R^6 is C_{1-4}alkyl, halo, C_{1-4}alkoxy, trifluoromethyl, or NR^7R^8.

23. A compound of claim 22 wherein R^6 is methyl.

24. A compound of claim 22 wherein R^6 is amino.

25. A pharmaceutical composition comprising a compound of claim 1 and a pharmaceutically acceptable carrier.

26. A method of treating infections by herpesviruses which comprises administering to a mammal in need thereof a compound of claim 1 or 2.

27. The method of claim 26 wherein said herpesviruses is herpes simplex virus types 1, herpes simplex virus types 2, varicella zoster virus, human cytomegalovirus, Epstein-Barr virus, human herpes virus 6, human herpes virus 7 or human herpes virus 8.

28. The method of claim 26 wherein said herpesviruses is human cytomegalovirus.

29. The method of claim 26 wherein said herpesviruses is varicella zoster virus or Epstein-Barr virus.

30. The method of claim 26 wherein said herpesviruses is herpes simplex virus types 1 or herpes simplex virus types 2.

31. The method of claim 26 wherein the compound of claim 1 is administered orally, parenterally or topically.

32. The method of claim 26 wherein the compound of claim 1 is in an amount of from about 0.1 to about 300 mg/kg of body weight.

33. The method of claim 26 wherein the compound of claim 1 is in an amount of from about 1 to about 30 mg/kg of body weight.

34. The method of claim 26 wherein said mammal is a human.

35. The method of claim 26 wherein said mammal is an animal.

36. A method of treating atherosclerosis and restenosis comprising administering to a mammal in need thereof a compound of claim 1 or 2.

37. A method for inhibiting a herpesviral DNA polymerase, comprising contacting the polymerase with an effective inhibitory amount of a compound of claim 1.

38. A compound of formula I, or a pharmaceutically acceptable salt thereof, for use in the manufacture of medicines for the treatment or prevention of a herpesviral infection in a mammal.

39. A compound of claim 1 which is

(1) *rac*-*N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyridin-3-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(2) (+)-*N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyridin-3-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(3) *rac*-*N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyridin-4-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(4) *rac*-*N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(5) (+)-*N*-(4-chlorobenzyl)-2-((((2*R*)-2-hydroxy-2-pyridin-2-ylethyl)(methyl)-amino)methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(6) *rac*-*N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-(6-methylpyridin-2-yl)ethyl)—(methyl)amino)methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(7) *rac*-*N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-quinolin-2-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(8) *rac*-*N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyrimidin-2-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(9) *N*-(4-chlorobenzyl)-2-((((2*R*)-2-hydroxy-2-pyrimidin-2-ylethyl)(methyl)-amino)methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(10) *rac*-*N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyrazin-2-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(11) *N*-(4-Chlorobenzyl)-2-((((2*R*)-2-hydroxy-2-pyrazin-2-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(12) *N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyridazin-3-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(13) *rac-N*-(4-chlorobenzyl)-7-ethyl-2-(((2-hydroxy-2-pyrazin-2-ylethyl)(methyl)-amino)methyl)-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(14) *rac-N*-(4-chlorobenzyl)-7-ethyl-2-(((2-hydroxy-2-pyridin-2-ylethyl)(methyl)-amino)methyl)-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(15) *rac-N*-(4-chlorobenzyl)-7-propyl-2-(((2-hydroxy-2-pyridin-2-ylethyl)(methyl)-amino)methyl)-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(16) *rac-N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyrazin-2-ylethyl)(methyl)amino)-methyl)-4-oxo-7-propyl-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(17) *N*-(4-chlorobenzyl)-7-(2,3-dihydroxypropyl)-2-((((2*R*)-2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)methyl)-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(18) *N*-(4-chlorobenzyl)-7-(3-hydroxypropyl)-2-((((2*R*)-2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)methyl)-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(19) *rac-N*-(4-chlorobenzyl)-7-(3-hydroxypropyl)-2-(((2-hydroxy-2-pyrimidin-2-ylethyl)(methyl)amino)methyl)-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(20) *N*-(4-chlorobenzyl)-7-(2-hydroxyethyl)-2-((((2*R*)-2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)methyl)-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(21) *rac-N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyrazin-2-ylethyl)(methyl)amino)-methyl)-7-(2-methoxyethyl)-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(22) *N*-(4-Chlorobenzyl)-2-((((2*R*)-2-hydroxy-2-pyrazin-2-ylethyl)(methyl)amino)-methyl)-4-oxo-7-(2-(2-(tetrahydro-2*H*-pyran-2-yloxy)ethoxy)ethyl)-4,7-dihydro-thieno[2,3-*b*]pyridine-5-carboxamide,

(23) *N*-(4-fluorobenzyl)-2-((((2*R*)-2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(24) *N*-(4-cyanobenzyl)-2-((((2*R*)-2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

(25) *N*-(4-bromobenzyl)-2-((((2*R*)-2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide, and a pharmaceutically acceptable salt thereof.

40. A compound of claim 39 which is *rac*-*N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]-pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof.

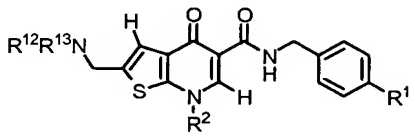
41. A compound of claim 39 which is (+)-*N*-(4-chlorobenzyl)-2-((((2*R*)-2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]-pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof.

42. A compound of claim 39 which is *rac*-*N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyrimidin-2-ylethyl)(methyl)amino)methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]-pyridine-5-carboxamide, or a pharmaceutically acceptable salt thereof.

43. A compound of claim 39 which is *N*-(4-chlorobenzyl)-2-((((2*R*)-2-hydroxy-2-pyrimidin-2-ylethyl)(methyl)amino)methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]-pyridine-5-carboxamide, or a pharmaceutically acceptable salt thereof.

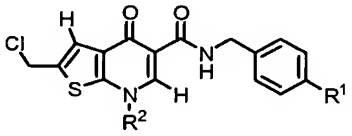
44. A method for preparing a compound of formula (I) according to claim 1 comprising:

(a) reacting an amine of a formula II,



II

with ethylchloroformate to produce a compound of the formula III,



III

and (b) reacting a compound of formula III with an amino alcohol of the formula $R^4R^5C(OH)CH_2NH(R^3)$ in the presence of an inorganic or tertiary amine base; wherein,

R^1 is

(a) Cl,

(b) Br,

(c) F, or

(d) CN;

R^2 is

(a) C_{1-4}alkyl optionally substituted by one or more OH or C_{1-4}alkoxy, or

(b) $(CH_2)_mOCH_2CH_2OH$;

R^3 is C_{1-2}alkyl;

R^4 is a six- (6) membered heteroaryl bonded via a carbon atom having 1, 2, or 3 nitrogen atoms, wherein R^4 is optionally fused to a benzene ring, and optionally substituted with one or more R^6;

R^5 is

(a) H, or

(b) C_{1-2}alkyl optionally substituted by OH;

R^6 is

(a) halo,

(b) OCF_3,

(c) cyano,

(d) nitro,

(e) $CONR^7R^8$,

(f) NR^7R^8,

(g) C_{1-7}alkyl, which is optionally partially unsaturated and is optionally substituted by one or more R^9,

(h) $O(CH_2CH_2O)_nR^{10}$,

(i) OR^{10}, or

(j) CO_2R^{10};

R^7 and R^8 are independently

(a) H,

(b) phenyl optionally substituted by halo, C_{1-7}alkyl, or C_{1-7}alkoxy,

(c) C_{1-7}alkyl which is optionally substituted by one or more OR^{10}, phenyl, or halo substituents,

(d) C_{3-8}cycloalkyl,

(e) $(C=O)R^{11}$, or

(f) R^7 and R^8 together with the nitrogen to which they are attached form a het, wherein het is a five- (5), or six- (6) membered heterocyclic ring having 1, 2, or 3 heteroatoms selected from the group consisting of oxygen, sulfur, or nitrogen, wherein het is optionally substituted with C_{1-4} alkyl;

R^9 is

(a) oxo,

(b) phenyl optionally substituted by halo, C_{1-7}alkyl, or C_{1-7}alkoxy,

(c) OR^{10},

(d) $O(CH_2CH_2)OR^{10}$,

(e) SR^{10},

(f) NR_7R_8,

(g) halo,

(h) CO_2R^{10},

(i) $CONR^{10}R^{10}$, or

(j) C_{3-8}cycloalkyl optionally substituted by OR^{10};

R^{10} is

(a) H,

(b) C_{1-7}alkyl,

(c) C_{3-8}cycloalkyl, or

(d) phenyl optionally substituted by halo, C_{1-7}alkyl, or C_{1-7}alkoxy;

R^{11} is

(a) C_{1-7}alkyl,

(b) C_{3-8}cycloalkyl, or

(c) phenyl optionally substituted by halo, C_{1-7}alkyl, or C_{1-7}alkoxy;

R^{12} and R^{13} are independently C_{1-7}alkyl, or R^{12} and R^{13} together with the nitrogen to which they are attached form morpholine, pyrrolidine, or piperidine;

n is 1, 2, 3, 4 or 5; and

m is 1 or 2.

45. A method according to claim 44 wherein R^{12} and R^{13} together with the nitrogen to which they are attached form morpholine.

46. A method according to claim 44 wherein R^{12} and R^{13} are independently methyl.

47. A method according to claim 44 wherein R^1 is chloro, R^2 and R^3 are independently methyl, R^4 is pyridin-2-yl, and R^5 is hydrogen.

48. A method according to claim 44 wherein R^1 is chloro, R^2 and R^3 are methyl, R^4 is pyrimidin-2-yl, and R^5 is hydrogen.

49. *N*-(4-Chlorobenzyl)-2-(chloromethyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide.